
Thirteen New Species of Neotropical Viscaceae (*Dendrophthora* and *Phoradendron*)

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ABSTRACT. A total of 13 new species of Viscaceae are described and illustrated for the genera *Dendrophthora* Eichler and *Phoradendron* Nutt. *Dendrophthora erythrantha* Kuijt is established from La Paz, Bolivia; *P. palandensis* is described from Zamora-Chinchipe, Ecuador. Eight species are newly described from Peru: five from Cajamarca (*D. cryptantha* Kuijt, *D. microphylla* Kuijt, *D. subsessilis* Kuijt, *P. alatum* Kuijt, and *P. camposii* Kuijt); two from Amazonas (*D. verrucosa* Kuijt and *P. nickrentianum* Kuijt); and one from Chachapoyas (*P. prolongatum* Kuijt). Three species are described from Venezuela: one from Carabobo (*P. concinnum* Kuijt) and two from Miranda (*D. mirandensis* Kuijt and *P. mirandensis* Kuijt).

Key words: Bolivia, *Dendrophthora*, Ecuador, IUCN Red List, Neotropical Viscaceae, Peru, *Phoradendron*, Venezuela.

The earlier monographic studies on the Neotropical viscaceous genera *Dendrophthora* Eichler and *Phoradendron* Nutt. (Kuijt, 1961, 2000, 2003a) apparently have by no means exhausted the great diversity of these genera in Neotropical areas. As a continuation of those studies, scrutiny of various herbaria and, especially, new materials that have been sent to me from the Missouri Botanical Garden, has revealed 13 more species that so far have not been accounted for. It is the purpose of the present contribution to bring these species to the notice of botanical science. It may be expected that even more entities will emerge in the future. The present paper raises the number of known species in *Dendrophthora* to 116 and in *Phoradendron* to 241.

1. *Dendrophthora cryptantha* Kuijt, sp. nov.

TYPE: Peru. Cajamarca: Sallique, Quebrada Grande, ruta entre La Cocha y Tablón, 2770–2900 m, 30 June 1998, C. Díaz, J. Campo, T. Guevara & E. Tineo 9793 (holotype, UC; isotype, MO not seen). Figure 1.

Haec species inter congeneros quoad inflorescentiam subsessilem globularem *Dendrophthorae harlingii* Kuijt tantum similis, sed ab ea habitu robustiore, cataphyllis basalibus plerumque absentibus, lamina foliari angustiore

atque praecipue systemate reproductivo monoico perfacile distinguitur.

Plants monoecious, robust, erect, somewhat succulent, glabrous except for some short, thick, convoluted yellow hairs at the base of young organs; stem internodes to 5 cm long, terete proximally, somewhat compressed below the nodes; basal cataphylls lacking, occasionally 1 pair 2–8 mm above the base; lowest foliar organs in median position. Prophylls prominent, acute, fringed with short, yellow hairs when young. Leaf blades to 5 × 1 cm, narrowly lanceolate to elliptic, apex obtuse to rounded, base acute, petiole 3–5 mm, indistinct; venation obscure. Inflorescence axillary, less than 5 mm long, peduncle 1 mm, bearing a single, globular internode with 6 flowers in biseriate or triseriate pattern, the flowers largely embedded in the swollen inflorescence axis; median flowers pistillate, lateral ones staminate. Fruits not known.

IUCN Red List category. *Dendrophthora cryptantha* is assessed as DD or Data Deficient, according to IUCN criteria (2001).

Discussion. *Dendrophthora cryptantha* is the second known species in *Dendrophthora* with nearly sessile, globular inflorescences, the other species being *D. harlingii* Kuijt (Kuijt, 2003b), originally described from Morona-Santiago but more recently also collected in Cajamarca. Nevertheless, they can scarcely be confused: *D. harlingii* is more slender and has basal cataphylls that *D. cryptantha* mostly lacks. The leaf blade of *D. harlingii* is broadly spatulate-obovate, while that of *D. cryptantha* is narrower. Most importantly, their breeding system differs in that *D. cryptantha* is monoecious while *D. harlingii* is dioecious.

2. *Dendrophthora erythrantha* Kuijt, sp. nov.

TYPE: Bolivia. La Paz: Prov. Inquisivi, comunidad Choquetanga (serranías de Lulini) a 13.5 km de Choquetanga, 16°44'S, 67°20'W, 3310 m, 3 Mar. 1994, N. Salinas 2607 (holotype, UC; isotype, LPB not seen). Figure 2.

Haec species *Dendrophthorae microphyllae* Kuijt per-similis, sed ab ea caulibus foliisque brevipubescentibus,

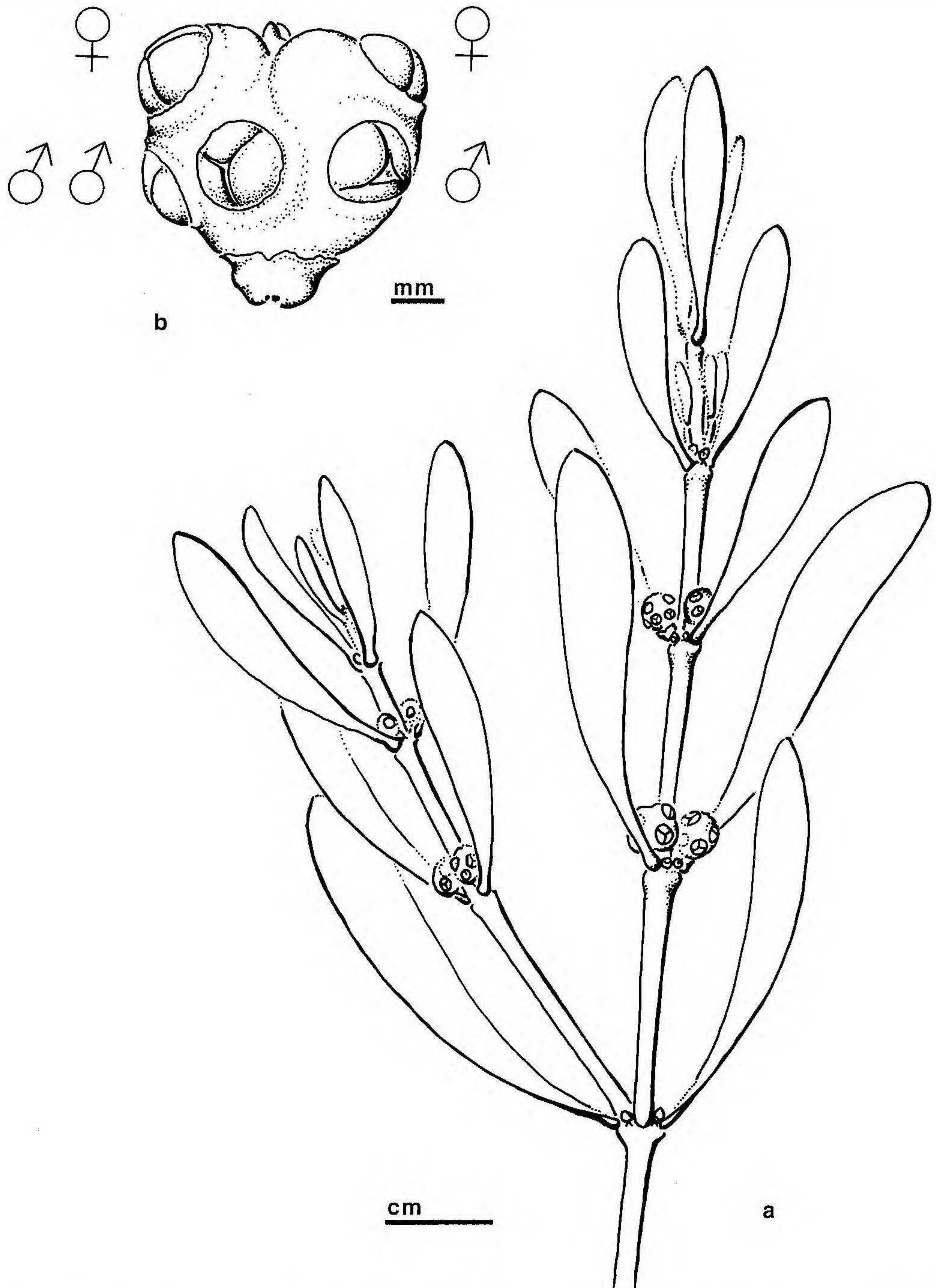


Figure 1. *Dendrophthora cryptantha* Kuijt. —A. Habit. —B. Inflorescence. Drawn from the holotype *Díaz et al.* 9793 (UC).

cataphyllis basalibus subacicularibus ad omnes ramos laterales minores praesentibus sed ad majores ut videtur absentibus, internodiis fertilibus 1 vel 2 atque systemate reproductivo dioico distinguitur.

Plants dioecious, delicate, covered with minute, short epidermal hairs, stems succulent, with prominent ridges when dry; lateral shoots with 1 pair of nearly acicular basal cataphylls to 4 mm, in median

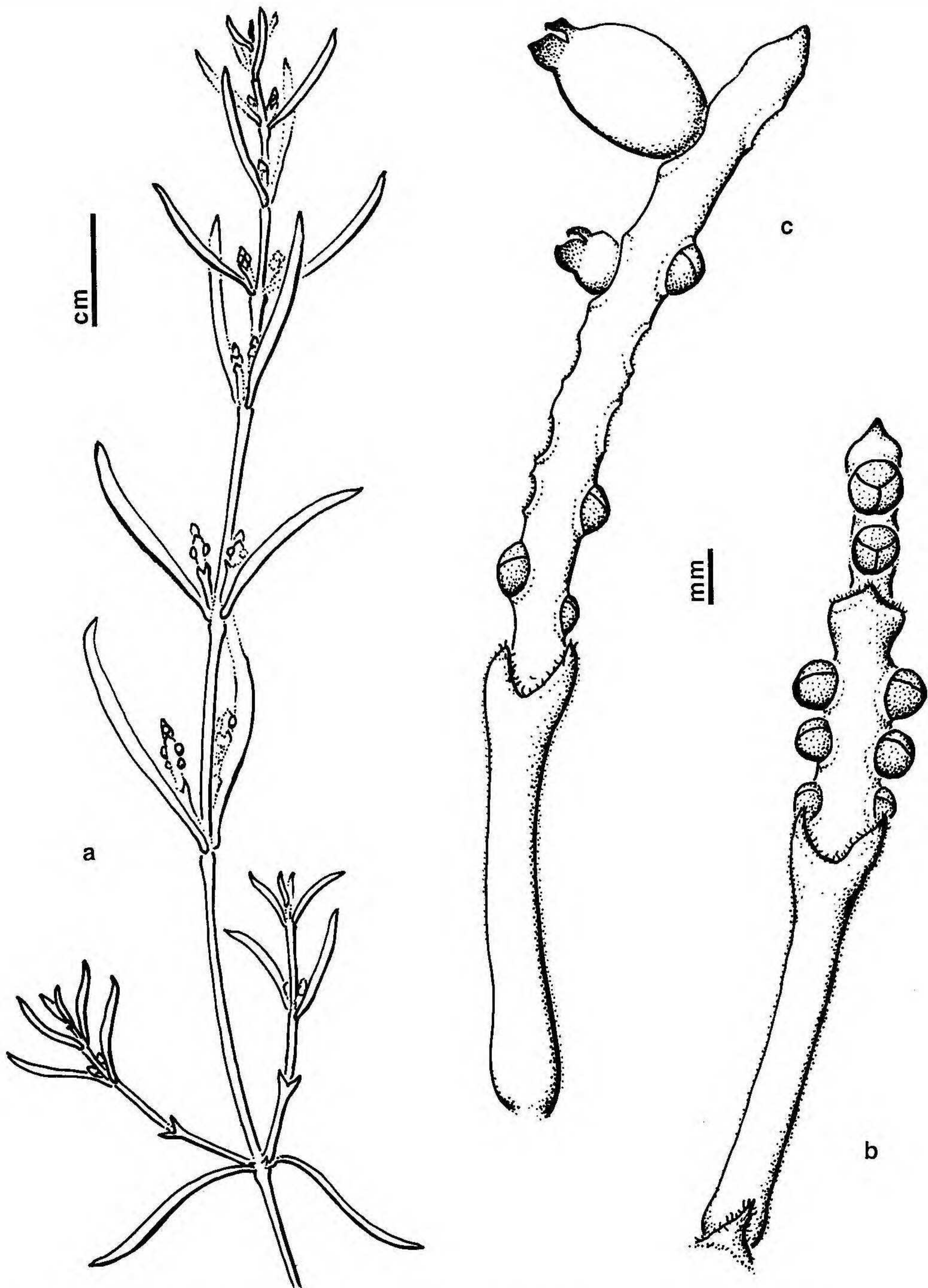


Figure 2. *Dendrophthora erythrantha* Kuijt. —A. Habit of staminate plant. —B. Staminate inflorescence. —C. Pistillate inflorescence, showing persistent petals on fruits. A, B drawn from the holotype *Salinas 2607* (UC); C from *Beck et al. 28851* (UC).

position, 1–1.5 cm above the base, basal cataphylls absent on many larger lateral shoots; prophylls prominent, acute, fimbriate. Leaves to 1.5×0.3 cm, succulent, lorate or nearly so, apex rounded to

acute, base tapering into indistinct petiole ca. 1 mm; venation obscure. Inflorescences axillary, solitary, 1–2 cm, slender; peduncle 5–7 mm, with yellow, acute fertile bracts; fertile internode 1 for pistillate flowers,

1 or 2 in the staminate, flowers uniseriate, to 6 per fertile bract, deeply sunken in the axis, bright red to yellowish red, ca. 1 mm diam., the floral cups finely papillate marginally. Fruit 3×2 mm, ovoid, yellowish with dark, persistent, erect petals.

IUCN Red List category. *Dendrophthora erythrantha* is assessed as DD or Data Deficient, according to IUCN criteria (2001).

Discussion. *Dendrophthora erythrantha* is very similar to the *D. microphylla* described below, but scrutiny reveals significant differences. In contrast to that species, its stems and leaves are covered with short epidermal hairs, its basal cataphylls are extremely long and pointed, being borne on all smaller branches but apparently absent from larger ones, and its inflorescences consist of one or two fertile internodes (vs. two or three? in *D. microphylla*). *Dendrophthora erythrantha* is dioecious, while *D. microphylla* may be possibly monoecious. The known localities of the two species are about 2000 km apart, from Bolivia and Peru, respectively. *Dendrophthora erythrantha* is a member of a large group of *Dendrophthora* species characterized by uniseriate inflorescences, including *D. fastigiata* Kuijt, *D. microphylla*, *D. squamigera* (Kuntze) Benth., and others. The type for *D. erythrantha* is pistillate; the paratype specimen staminate.

Paratype. BOLIVIA. **La Paz:** Prov. Nor Yungas, Homuni Alto, 15 m al costado de la 3a estación meteorológica, zona de neblina, $16^{\circ}11'S$, $66^{\circ}54'W$, 3140 m, sobre Ericaceae, 7 Aug. 2003, Beck et al. 28851 (LPB, UC).

- 3. *Dendrophthora microphylla* Kuijt, sp. nov.**
TYPE: Peru. Cajamarca: Jaén, Sallique, localidad de Lanchal, 300 m, 27 June 1998, C. Díaz, J. Campos, T. Guevara & E. Tineo 9700 (holotype, UC; isotype, MO-1104823 not seen). Figure 3.

Haec species *Dendrophthorae squamigerae* (Benth.) Kuntze ut videtur arcte affinis et *D. erythranthae* Kuijt persimilis, sed a hac caulibus foliisque glabris, cataphyllis basalibus ad ramos laterales plerumque absentibus, internodiis fertilibus 2 vel 3 atque systemate reproductivo monoico, ab illa habitu elongatiore atque foliis persistentibus distinguitur.

Plants presumed as monoecious, branching, erect, glabrous; stem internodes 1–2 cm, terete; basal cataphylls absent on most lateral branches, 1 pair 1–1.5 cm above the base on others. Leaves to 1×0.4 cm wide, persistent, fleshy, narrowly lanceolate, apex acute, base acute, petiole 2 mm, distinct. Inflorescence 2–3 cm, spreading to perpendicular to main stem, 1 per leaf axil, peduncle 5–7 mm, terete, fertile

internodes 2 or 3, with 3 to 5 flowers in uniseriate rows, each flower clasped by a deep alveolus fringed with short, stiff, shiny marginal hairs. Fruit 2.5×2 mm, translucent white, petals persistent, erect.

IUCN Red List category. *Dendrophthora microphylla* is assessed as DD or Data Deficient, according to IUCN criteria (2001).

Discussion. *Dendrophthora microphylla* would seem to be closely related to the more northern *D. squamigera* and its relatives, but the plants are more elongated and have persistent leaves. *Dendrophthora squamigera* has small leaves only in its juvenile stage, but none subtend its inflorescences (cf. Kuijt, 1961: fig. 47b). See also comments under *D. erythrantha*.

- 4. *Dendrophthora mirandensis* Kuijt, sp. nov.**
TYPE: Venezuela. Miranda: Zamora, Cordillera de la Costa, Parque Nac. El Avila, El Bautismo, al NE de Guatire, zona de cafetales, $10^{\circ}31'N$, $66^{\circ}29'W$, 1250–1500 m, 4 Jan. 2006 (♀ fl.), W. Meier & J. L. Hernández-Bretón 12539 (holotype, UC; isotype, VEN not seen). Figure 4.

Haec species quoad caracteres nonnullos *Phoradendro kelloggii* Kuijt similis, sed ab eo surculis percurrentibus cataphyllis intercalariis praeditis atque inflorescentiae quaque bractea fertili florem unicum subtendente distinguitur, inter congeneros quoad habitum saepe dichotomum atque inflorescentiam parvam paucifloram insignis.

Plants presumed dioecious, delicate, much branched; young parts very finely short-papillate; lateral branches delicate, with mostly 2 pairs of small basal cataphylls ca. 3 and 12 mm above the axil; lowest foliar organs of lateral median in position; branching occasionally percurrent, where provided with 2 pairs of intercalary cataphylls, but mostly dichotomous through the production of terminal inflorescences. Leaf blade to 4×1.5 cm, oblanceolate, avenous, apex obtuse and with small knoblike thickening, base cuneately tapering into indistinct petiole ca. 5 mm. Pistillate inflorescences nodal and terminal, peduncles simple or paired, the sterile internodes 1 mm, followed by 3 fertile internodes with 1 flower per fertile bract placed on the distal half of the internode. Neither the staminate plant nor the fruits are known.

Distribution and IUCN Red List category. The new species is known only from the type collection, and *Dendrophthora mirandensis* is assessed as DD or Data Deficient, according to IUCN criteria (2001).

Discussion. *Dendrophthora mirandensis* is an inconspicuous but morphologically highly distinctive

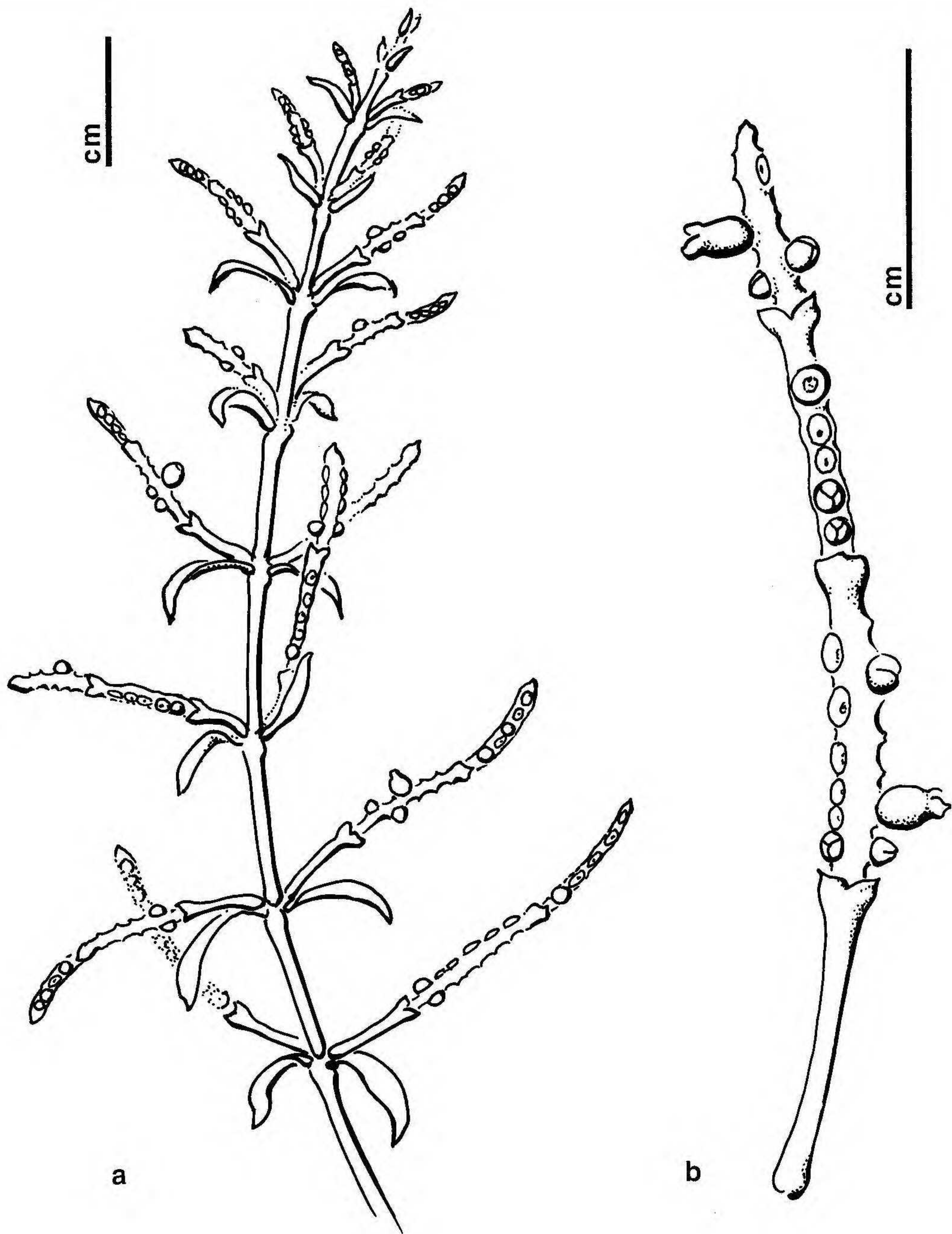


Figure 3. *Dendrophthora microphylla* Kuijt. —A. Fertile habit. —B. Infructescence. Drawn from the holotype Díaz *et al.* 9700 (UC).

species, remarkable by its often dichotomous habit and the small, few-flowered inflorescences. The new taxon has a number of morphological features in common with the rare *Phoradendron kelloggii* Kuijt from Venezuela (Kuijt, 2003a), but, aside from the documented anthers, the latter has several flowers per

fertile bract (vs. one and distally located) in a uniseriate pattern, and lacks intercalary cataphylls in its percurrent shoots. *Dendrophthora mirandensis* is known only from the pistillate plants of the type; staminate inflorescences may well be more floriferous, as in other dioecious *Dendrophthora* species.

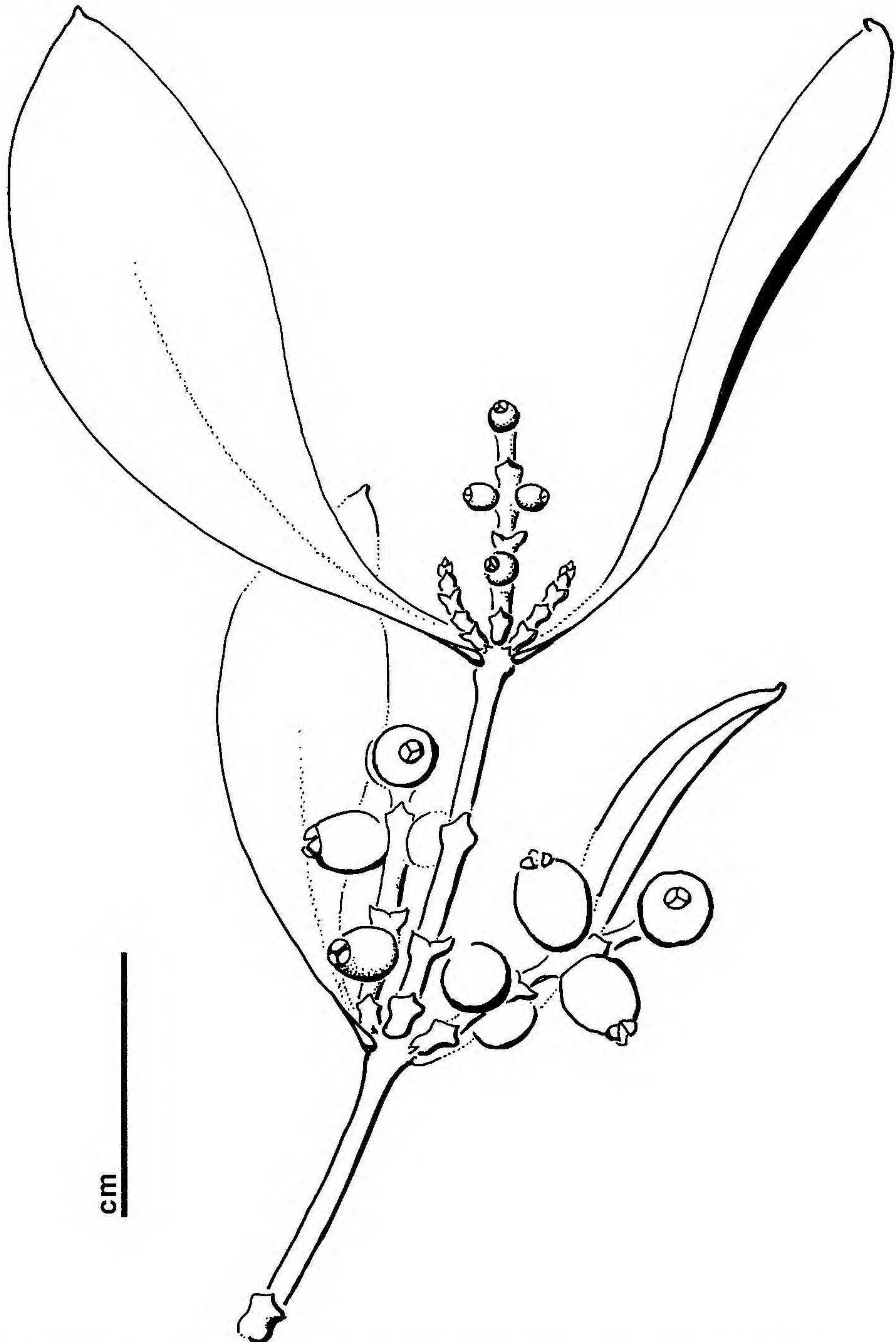


Figure 4. *Dendrophthora mirandensis* Kuijt. Innovation bearing fruit at lower node, with young inflorescences seen above. Drawn from the holotype Meier & Hernández-Bretón 12539 (UC).

5. *Dendrophthora subsessilis* Kuijt, sp. nov. TYPE:
Peru. Cajamarca: Prov. San Ignacio, Huarango–
San Martín, Nuevo Peru, 5°22'S, 78°30'W, 900
m, 14 May 1996 (♂ fls.), R. & A. Vásquez 20837
(holotype, UC; isotype, MO-4782656). Figure 5.

Haec species *Dendrophthorae costaricensi* Urb. verosimi-
liter affinis, sed ab ea foliis late obovato-spathulatis,
inflorescentia staminata subsessili, floribus biseriatis atque
systemate reproductivo dioico facile distinguitur, inter
omnes congeneros quoad cataphylla basalia numerosa inter
se remota insignis.

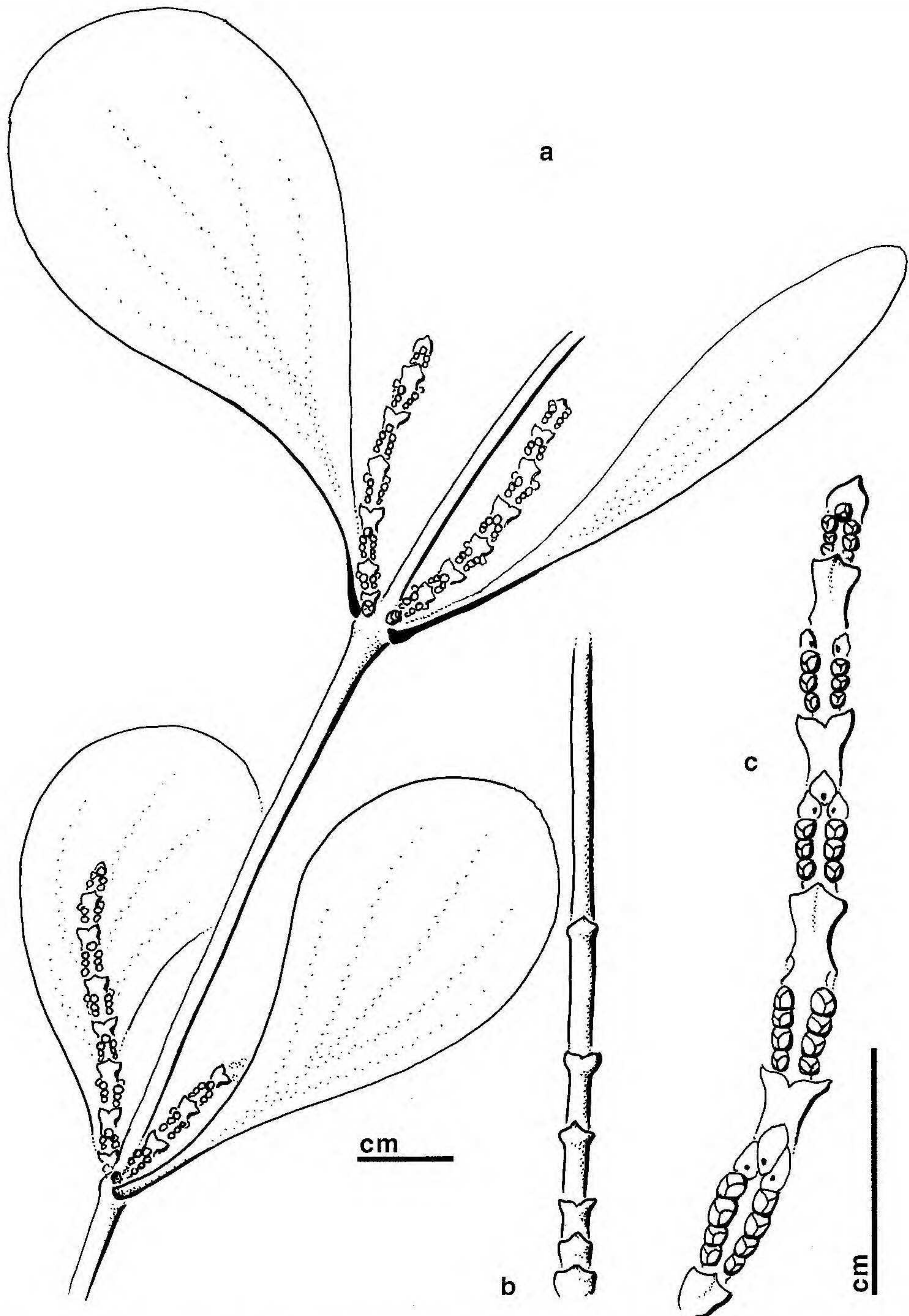


Figure 5. *Dendrophthora subsessilis* Kujt. —A. Leafy shoot with inflorescences. —B. Basal cataphylls. —C. Inflorescence. A–C drawn from the holotype R. & A. Vásquez 20837 (UC).

Plants dioecious, stature medium-sized, glabrous, percurrent; stem internodes to 7 cm long, terete; basal cataphylls in 4 to 6 pairs, the upper ones placed nearly halfway to the nearest foliar node. Leaf blades

to 8×4 cm wide, broadly obovate-spatulate, apex rounded, base long-tapering to an indistinct, slender petiole ca. 1 cm; venation with $5 \pm$ basal, fairly obscure veins, the middle one not reaching the apex.

Staminate inflorescence ca. 3 cm, peduncle extremely short, to 1.5 mm, followed by 5 to 7 fertile internodes, staminate flowers 5 to 13 per fertile bract, in biseriate rows. Pistillate plants not known.

Distribution and IUCN Red List category. *Dendrophthora subsessilis* is assessed as DD or Data Deficient, according to IUCN criteria (2001). The taxon is known only from the type collection.

Discussion. *Dendrophthora subsessilis* is probably related to the more northern *D. costaricensis* Urb. The new taxon is easily distinguishable because of its unusual leaf shape, the extremely short peduncle of the staminate inflorescence and the biseriate pattern of its flower, and the plant's dioecy. The large number of widely spaced basal cataphylls is also a very unusual feature in the genus.

6. *Dendrophthora verrucosa* Kuijt, sp. nov. TYPE: Peru. Amazonas: a few km. from Molinapampa, on scrub on sandy soil with rock outcrops, 14 Mar. 1998 (♂ fls.), *H. van der Werff*, *B. Gray*, *R. Vásquez* & *R. Rojas* 14937 (holotype, UC; isotype, MO not seen). Figure 6.

Haec species *Dendrophthorae dimorphae* Kuijt subsimilis, sed ab ea internodiis verrucosis teretibus, ramis lateralibus cataphyllis basalibus praeditis atque foliis palmatim triveniis distinguitur.

Plants dioecious, densely leafy, erect, stems finely verrucose, with internodes to 5 cm, terete, brown; basal cataphylls as 1 pair, 5–10 mm above the base. Leaf blades ca. 4 × 2 cm, thin, elliptical to obovate, apex rounded, base tapering into indistinct, slender petiole ca. 8 mm; venation palmate, with 2 long basal lateral veins; leaf margin smooth, translucent when dry. Staminate inflorescence to 3 cm, axillary, usually in clusters of 3; peduncle simple, 5–7 mm, slender, with fertile internodes 2 or 3, flowers 19 to 30 per fertile internode and triseriate. Pistillate plant and fruits not known.

Distribution and IUCN Red List category. *Dendrophthora verrucosa* is assessed as DD or Data Deficient, according to IUCN criteria (2001), and is known only from the type collection.

Discussion. *Dendrophthora verrucosa* is an attractive species of erect stature, distinguishable by its brown, finely verrucose stems and elegant inflorescences with numerous triseriate flowers. I have verified the unilocular anther structure, which confirms the position of the species in *Dendrophthora*. The species may be confused with *D. dimorpha* Kuijt (Kuijt, 1990), but *D. verrucosa* differs in being

distinctly verrucose rather than glabrous, in having terete rather than flattened and grooved internodes, and in having basal cataphylls on lateral branches. The leaves of the two species especially are very similar, but *D. dimorpha* has at least five palmate veins, while *D. verrucosa* has only three. The known localities of *D. dimorpha* and *D. verrucosa* are slightly more than 100 km apart, both known only from Amazonian Peru.

7. *Phoradendron alatum* Kuijt, sp. nov. TYPE: Peru. Cajamarca: Distr. San José de Lourdes, vic. of Poblado Los Llanos, 5°6'16"S, 78°51'11"W, 1875 m, 12 Oct. 2006 (♀ fl.), *J. Perea* & *V. Flores* 2831 (holotype, UC; isotypes, AMAZ not seen, HUT not seen, MO not seen, MOL not seen, USM not seen). Figure 7.

Plantae perrobustae, glabrae, praecipue caulibus inflorescentiisque in sicco laccatae; internodia usque ad 5 cm longa et 12 mm crassa, valde quadrangularia usque 4-alata. Petiolus usque ad 2.5 cm longus; lamina foliaris usque ad 15 × 9 cm, subelliptica. Inflorescentiae ca. 5.5 cm longae, ad axillas foliaries crebrae, internodiis sterilibus 2 vel 3 crebris, fertilibus ca. 6, quaque bractea fertili flores 4 ad 6 subtendente.

Plants presumed as monoecious, very robust, percurrent, glabrous, especially the stems and inflorescences lacquered when dry; stem internodes to 5 × 1.2 cm, strongly quadrangular to 4-winged. Leaf blades to 15 × 9 cm, ± elliptical; petiole to 2.5 cm, stout, distinct; venation pinnate, the strongly keeled midrib running into the apex. Inflorescences ca. 5.5 cm long, crowded in leaf axils, each with 2 or 3 short sterile internodes together 6–10 mm long, followed by ca. 6 fertile internodes each 8–10 mm long and swollen in the middle where bearing 4 to 6 sunken flowers, with those investigated being pistillate, per fertile bract. Fruit unknown, said to be yellowish orange.

Distribution and IUCN Red List category. The new species is known only from the type collection, and *Phoradendron alatum* is assessed as DD or Data Deficient, according to IUCN criteria (2001).

Discussion. *Phoradendron alatum* almost certainly belongs to the assemblage of species including *P. dipterum* Eichler, *P. fasciculatum* Kuijt, and several others, all of which are (perhaps exclusively) hyperparasitic on various other mistletoes, both Loranthaceae and Viscaceae. *Phoradendron dipterum* especially also has strongly quadrangular or even somewhat winged internodes. Unfortunately, the type of *P. alatum* is badly fragmented, and the illustration represents a reconstruction. The inflorescence ap-

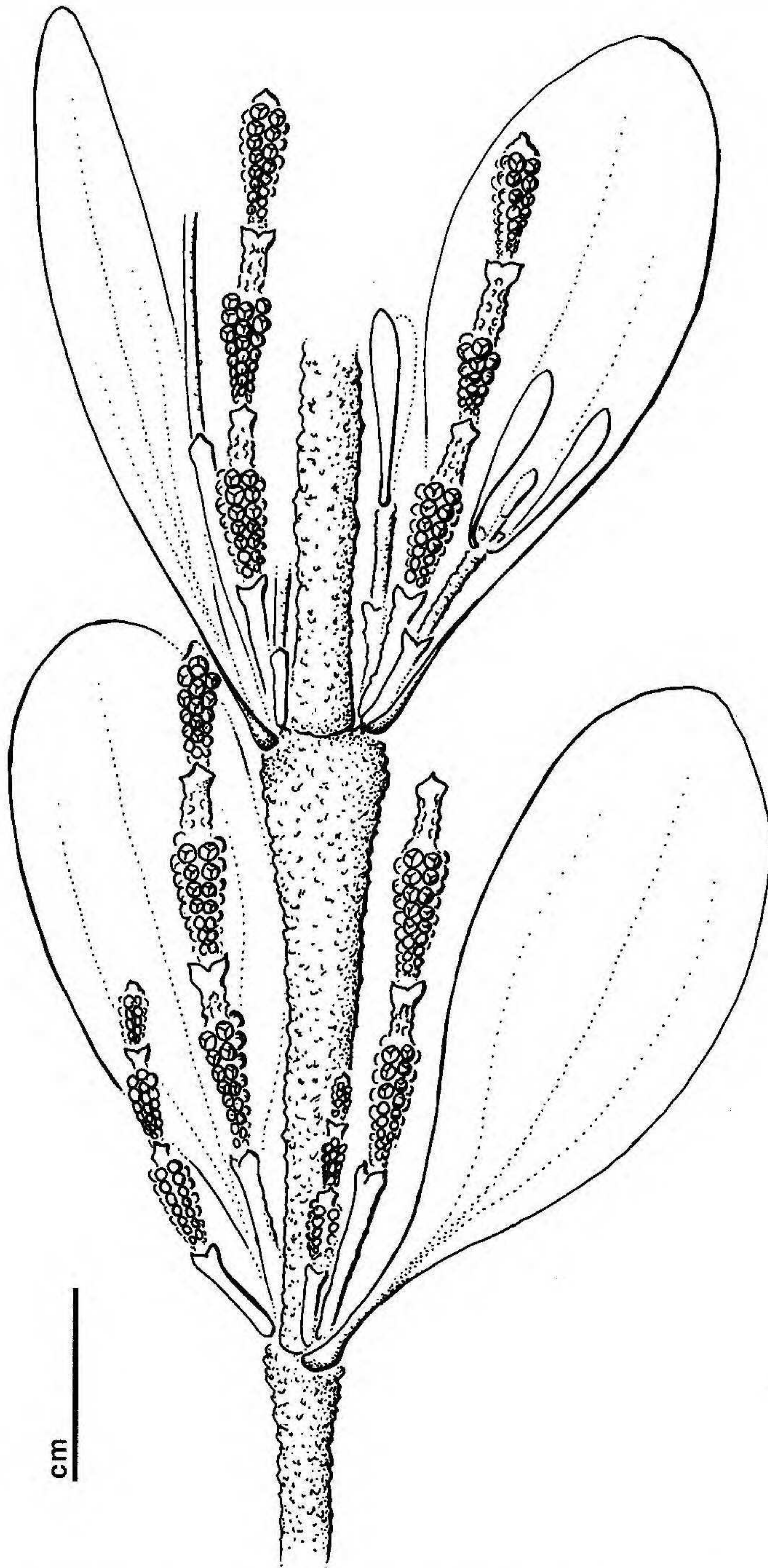


Figure 6. *Dendrophthora verrucosa* Kujt. Fertile habit. Drawn from *van der Werff et al. 14937* (UC).

pears to have only pistillate flowers, but sex distribution in the related *P. dipterum* is extremely variable (Kujt, 2003a), and dioecy in the present species is not clearly demonstrated.

8. *Phoradendron camposii* Kujt, sp. nov. TYPE: Peru. Cajamarca: San Ignacio Prov., Distr. San José del Río Chirinos (Río mira flores), 5°12'S, 78°46'W, 600–700 m, 16 Apr. 1996, *J. Campos*

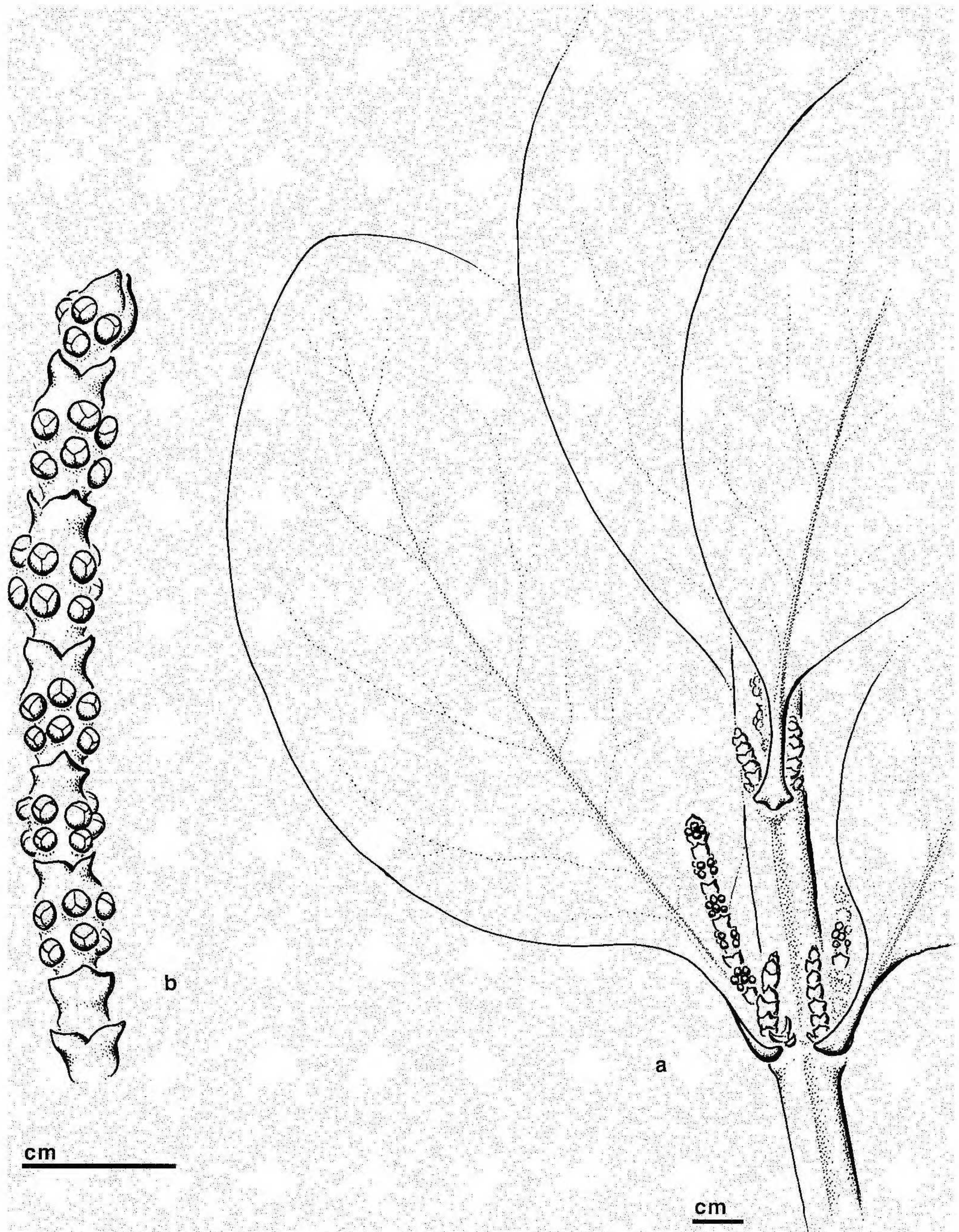


Figure 7. *Phoradendron alatum* Kuijt. —A. Fertile habit. —B. Inflorescence. A, B drawn from the holotype *Perea & Flores 2831* (UC).

& *P. Díaz 2608* (holotype, UC; isotype, MO-1510501 not seen). Figure 8.

Haec species *Phoradendro quadrangulari* (Kunth) Griseb. persimilis, sed ab eo plantae partibus (praesertim

caulibus foliisque) majoribus atque internodiis juvenibus veteribusque teretibus distinguitur.

Plants monoecious, medium-sized, glabrous; stem internodes to 4 cm, terete; basal cataphylls as 1 pair, 3 mm above the base, inconspicuous. Leaf blade to 7



Figure 8. *Phoradendron camposii* Kujt. Fertile habit. Drawn from the holotype Campos & Díaz 2608 (UC).

× 1.5 cm, spatulate, apex rounded, base acute to cuneate and tapering into a slender petiole ca. 3 mm; venation basal-palmate but obscure. Inflorescence to 3 cm long when in fruit, mostly 1 per leaf axil,

peduncle simple, 2–3 mm, fertile internodes 3(4), flowers 3 to 7 per fertile bract, biseriate, mostly pistillate, staminate flowers few and irregularly placed. Fruit 3 × 2.5 mm, ovoid, yellow, petals close.

IUCN Red List category. *Phoradendron camposii* is assessed as DD or Data Deficient, according to IUCN criteria (2001).

Discussion. I have long hesitated before describing *Phoradendron camposii* as a separate species, as it is extremely similar to the common *P. quadrangulare* (Kunth) Griseb., which also occurs in northern Peru. However, the young and old stems are uniformly terete rather than quadrangular, and the plant (especially the stems and leaves) seems significantly larger than *P. quadrangulare*. The fact that two nearly identical collections are available from different but nearby localities now confirms its separate status.

Paratype. PERU. **Cajamarca:** San Ignacio Prov., Zapotal–Huarango, 5°21'S, 78°43'W, 600–1000 m, 20 Jan. 1996, *J. Campos & O. Díaz 2058* (UC).

9. *Phoradendron concinnum* Kuijt, sp. nov. TYPE: Venezuela. Carabobo: Limite Distr. Montalbán–Bejuma, Cordillera de la Costa, O de la carr. Bejuma–Canoabo, 10 km (dist. aera) NNO de Bejuma, Cerro El Marquero, bosque, 900–1000 m, 10°16'N, 68°17'O, 27 Dec. 2004 (♀ fl.), *W. Meier & N. Flanger 10887* (holotype, UC; isotype, VEN not seen). Figure 9.

Haec species sine dubio *Phoradendro craspedophyllo* Eichler et *P. harleyi* Kuijt arcte affinis, sed ab eis innovationibus sterilibus cataphyllis praeditis atque inflorescentiae internodiorum fertilium quaque bractea fertili flores usque ad 17 subtendente distinguitur.

Plants presumed dioecious, relatively small, only to 20 cm, glabrous, dichotomous by means of terminal inflorescences; sterile innovations to 9 cm, the internodes terete, basal cataphylls 2 pairs, at 2–3 mm and 13–17 mm above the base. Leaf blades to 6 × 2.5 cm, lanceolate, apex obtuse, base ± acute, tapering into 3 mm, indistinct petiole; venation palmate, with 3 major veins running to or near the apex. Inflorescence at least 2 cm at anthesis, peduncle simple, 2 mm, fertile internodes at least 5, flowers to 17 per fertile bract, triseriate. Infructescence elongating in fruit, fruits 3 × 2 mm, ovoid, placed in deep alveoli.

IUCN Red List category. *Phoradendron concinnum* is assessed as DD or Data Deficient, according to IUCN criteria (2001).

Discussion. *Phoradendron concinnum* is undoubtedly a close relative of *P. craspedophyllum* Eichler and *P. harleyi* Kuijt, differing from both in that the cataphylls on innovations are sterile, and in that the fertile internodes bear up to 17 flowers per

fertile bract rather than only three. The aforementioned species are known only from the Brazilian states of São Paulo and Bahia, respectively. Both are monoecious, the median of each trio of flowers staminate, the two lateral ones pistillate. However, in *P. concinnum* I have not been able to establish its sex distribution, even though the type appears to be pistillate, bearing numerous fruits; no staminate flowers have been seen.

Paratype. VENEZUELA. **Distrito Capital–Miranda border:** Parque Nacional El Ávila, Cordillera de la Costa, al NE de Guatire, al NE de El Bautismo, camino a la sabana, bosque nublado, 10°32'N, 66°28'W, 1450–1550 m, 29 Feb. 2004, *W. Meier & Hernández-Brebón 10045* (UC, VEN not seen).

10. *Phoradendron mirandensis* Kuijt, sp. nov. TYPE: Venezuela. Miranda: Arboretum Escuela de Biología, SW del Valle de Caracas, Colinas de Bello Monte, 1100 m, 9 Apr. 1992 (♀ fl.), *N. Ramírez & M. López 3194* (holotype, UC; isotype, MO-1620946 not seen). Figure 10.

Haec species *Phoradendro congesto* Trel. subsimilis, sed ab eo internodiis teretibus, cataphyllis basalibus in pari unico, pedunculo brevissimo atque inflorescentiae quaque bractea fertili flores pauciores subtendente distinguitur.

Plants dioecious, leggy, glabrous, percurrent; stem internodes 4–9 cm long, terete; basal cataphylls as 1 pair; all scale leaves white-margined. Leaves 7–12 × 1.5–2.5 cm, narrowly elliptical, apex obtuse to rounded, base acutely tapering into indistinct petiole 5 mm long; venation palmate but mostly obscure. Pistillate inflorescences crowded at the (somewhat expanded) nodes, to 2 cm long, the peduncle simple, to 4 mm, fertile internodes mostly 3, flowers usually 3 per fertile bract, biseriate or triseriate, the proximal and distal fertile internodes often reduced to 1 flower per bract. Fruits 3.5 × 2.5 mm thick, ovoid, greenish yellow, the petals closed. Staminate plants not known.

Distribution and IUCN Red List category. All four specimens of the new species were gathered from the same locality. *Phoradendron mirandensis* is assessed as DD or Data Deficient, according to IUCN criteria (2001).

Discussion. *Phoradendron mirandensis* somewhat resembles *P. congestum* Trel. from Brazil and Amazonian Ecuador, differing in its very short inflorescence peduncle and fewer flowers per fertile bract. *Phoradendron mirandensis* also contrasts with its terete rather than quadrangular-keeled internodes and one pair rather than (mostly) two pairs of basal cataphylls.

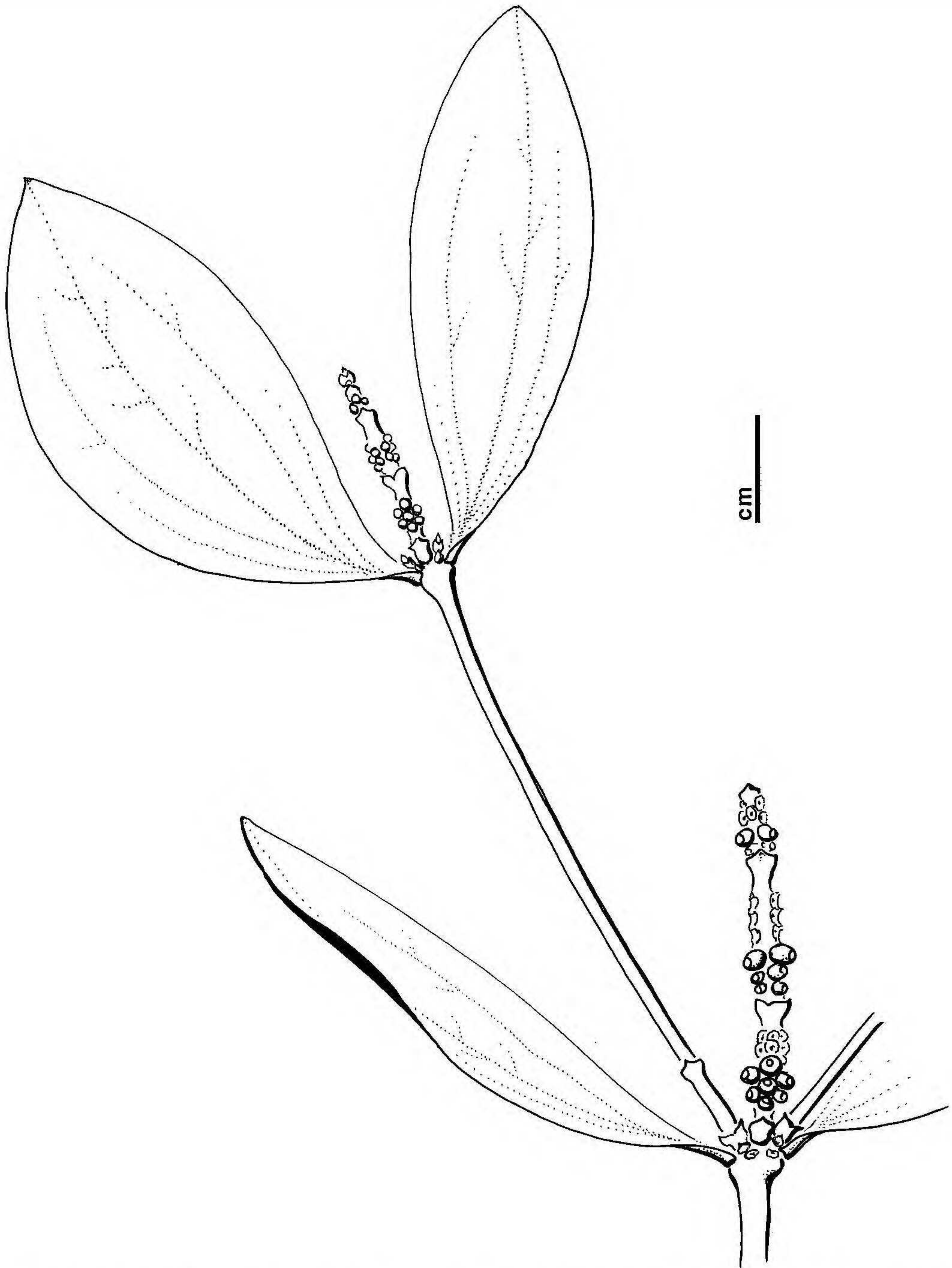


Figure 9. *Phoradendron concinnum* Kujt. Habit, showing two terminal inflorescences and one innovation. Drawn from the holotype Meier & Flanger 10887 (UC).

Paratypes. VENEZUELA. **Miranda:** Arboretum Escuela de Biología, SW del Valle de Caracas, Colinas de Bello Monte, on *Machaerium robiniiifolium* Vogel, M. López 291 (UC), 292 (UC); on *Zanthoxylum ciliatum* Engl., López 293 (UC).

11. *Phoradendron nickrentianum* Kujt, sp. nov.
 TYPE: Peru. Amazonas: Rodríguez de Mendoza, Mariscal Benavides, Izcuchaca, 6°19'40"S, 77°31'5"W, 1880 m, 29 Aug. 1998 (♂ fls.),

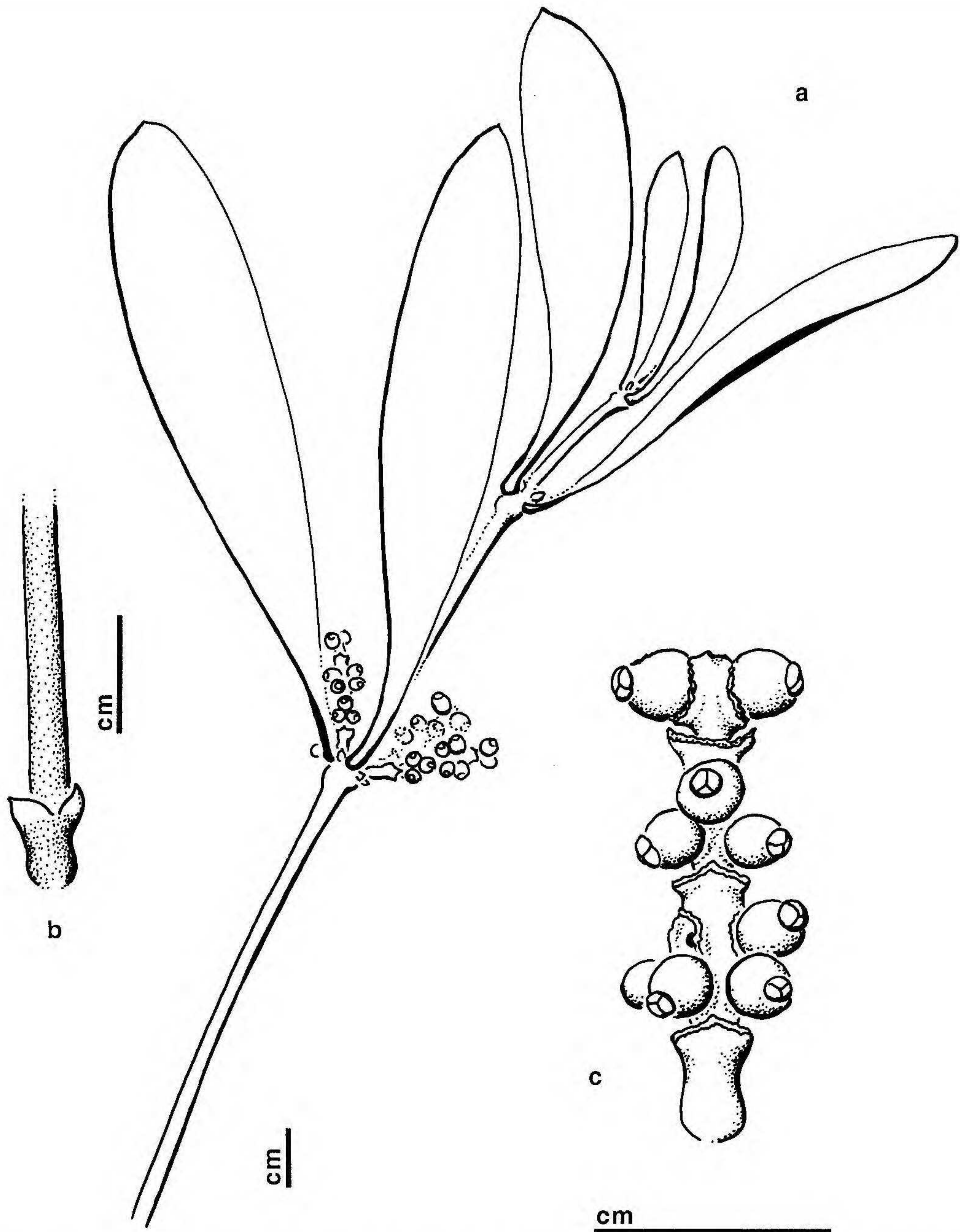


Figure 10. *Phoradendron mirandensis* Kuijt. —A. Habit. —B. Basal cataphylls. —C. Infructescence. A–C drawn from the holotype Ramírez & López 3194 (UC).

R. Vásquez & J. Campos 25306 (holotype, UC; isotype, MO-1510519). Figure 11.

Haec species fere certe *Phoradendro undulato* (Pohl ex DC.) Eichler arcte affinis, sed ab eo cataphyllis basalibus in

pari unico, pedunculo simplici atque inflorescentiae quaque bractea fertili flores 5 ad 9 subtendente distinguitur.

Plants dioecious, large, percurrent, glabrous; stem internodes to 9 cm, sharply keeled and expanded to nearly 1 cm below foliar nodes; basal cataphylls 1



Figure 11. *Phoradendron nickrentianum* Kuijt. —A. Fertile habit. —B. Inflorescence. A, B drawn from the holotype Vásquez & Campos 25306 (UC).

pair, 1 cm above the base, inconspicuous, the following internode terete. Leaf blades to 14×4.5 cm, ovate to lanceolate, apex and base acute, petiole ca. 1 cm; venation pinnate, the midvein conspicuous

and running into the apex. Staminate inflorescence to 4.5 cm, peduncle 2 mm, simple, followed by up to 9 fertile internodes; flowers 5 to 9 per fertile bract, biseriate. Pistillate plants unknown.

Etymology. *Phoradendron nickrentianum* is named in honor of Daniel L. Nickrent (1956–) of Southern Illinois University who, with numerous collaborators, has brought the knowledge of parasitic angiosperms to unprecedented heights.

Distribution and IUCN Red List category. *Phoradendron nickrentianum* is assessed as DD or Data Deficient, according to IUCN criteria (2001). It is known only from the type collection.

Discussion. The similarity of *Phoradendron nickrentianum* to *P. undulatum* (Pohl ex DC.) Eichler from Brazil is striking, and almost certainly indicates a close affinity. In contrast to the new species, however, *P. undulatum* usually has two or three pairs of basal cataphylls (vs. one pair), the upper pair(s) being placed very high on the branch, a compound inflorescence peduncle (vs. simple), and only five to seven flowers per fertile bract (vs. five to nine). Most importantly, *P. undulatum* is monoecious, while *P. nickrentianum* is dioecious. I have established that the species has bilocular anthers.

12. *Phoradendron palandensis* Kuijt, sp. nov. TYPE: Ecuador. Zamora-Chinchipe: Palanda, región de la Cordillera del Condor, Parroquia San Francisco de Vergel, riberas del Río Vergel, entre Santa Rosa y La Camela, 4°39'7"S, 79°1'41"W, 1200 m, 6 Mar. 2007 (♀ fls.), *W. Quizhpe & A. Wisum 2496* (holotype, UC; isotype, MO not seen, QCNE not seen). Figure 12.

Haec species *Phoradendro roldanii* Kuijt arcte affinis, sed ab ea ramificatione dichotoma, inflorescentia multo longiore atque internodiis fertilibus pluribus flores pauciores gerentibus distinguitur.

Plants dioecious, glabrous, dichotomously branching; innovations to 9 cm long, terminating in 1 pair of leaves, bearing 2 to 4 pairs of cataphylls, the uppermost pair often reaching the middle of the innovation; internodes terete but much expanded at the foliar nodes. Leaf blades to 9×6 cm wide, broadly lanceolate, apex nearly acute, base tapering into a flat, indistinct petiole ca. 5 mm; venation pinnate but obscure. Presumed pistillate? inflorescences to 11 cm long, clustered at the foliar nodes, with 2 or 3 short sterile internodes followed by up to 17 fertile internodes, each fertile bract subtending 3 to 5 flowers in a biseriate pattern. Staminate plants or flowers not known; fruit not seen, but said to be yellow.

Distribution and IUCN Red List category. *Phoradendron palandensis* is assessed as DD or Data

Deficient, according to IUCN criteria (2001), and is known only from the type collection.

Discussion. Described from eastern Ecuador, *Phoradendron palandensis* is a close relative of the Colombian endemic *P. roldanii* Kuijt, differing in its dichotomous branching, much longer inflorescences with more numerous fertile internodes, the latter bearing fewer flowers. I have not been able to ascertain whether innovations in *P. palandensis* terminate in an inflorescence, or whether the dichotomous habit is a matter of abortion of the apex.

13. *Phoradendron prolongatum* Kuijt, sp. nov. TYPE: Peru. Chachapoyas: Marañon River Valley, Celendín–Chachapoyas rd., 25–35 km from Puente Chocanto, 2060–2500 m, 24 May 1984 (♂ fls.), *D. N. Smith & J. Cabanillas 7085* (holotype, UC; isotype, MO-1510515 not seen). Figure 13.

Haec species a congeneris internodiis elongatis usque ad 12 cm longis distaliter compressis carinatisque, foliis longis angustis atque floribus biseriatatis distinguitur.

Plants dioecious, extremely leggy, glabrous, pendent, 1.5 m diam., percurrent; stem internodes to 12 cm, \pm terete proximally, becoming keeled distally where compressed to 1 cm width below the nodes. Basal cataphylls 1 pair, about 5 mm above the base, spreading when dry, acute. Leaves to 11×3 cm, including the 1 cm, indistinct petiole, the blades coriaceous, narrowly lanceolate, apex obtuse, base long-tapering into petiole; venation pinnate, only the midrib evident. Staminate inflorescence solitary or in groups of 3 in leaf axils, nearly 3 cm long, peduncle simple, to 3 mm, followed by 3 fertile internodes bearing up to 13 flowers per fertile bract in a biseriate pattern.

Distribution and IUCN Red List category. *Phoradendron prolongatum* is assessed as DD or Data Deficient, according to IUCN criteria (2001).

Discussion. *Phoradendron prolongatum* is distinctive through its much elongated, flattened to keeled internodes to 12 cm and its long, narrow leaves, combined with the biseriate flower pattern. I have checked the anthers and, even though this plant occurs at higher elevations, which is atypical for *Phoradendron*, its bilocular anther clearly places it in that genus.

The above diagnosis does not include a curious feature seen in all available inflorescences for *Phoradendron prolongatum*, viz. terminal proliferation (see Fig. 13C). It is impossible to say at this time whether this terminal inflorescence portion will later

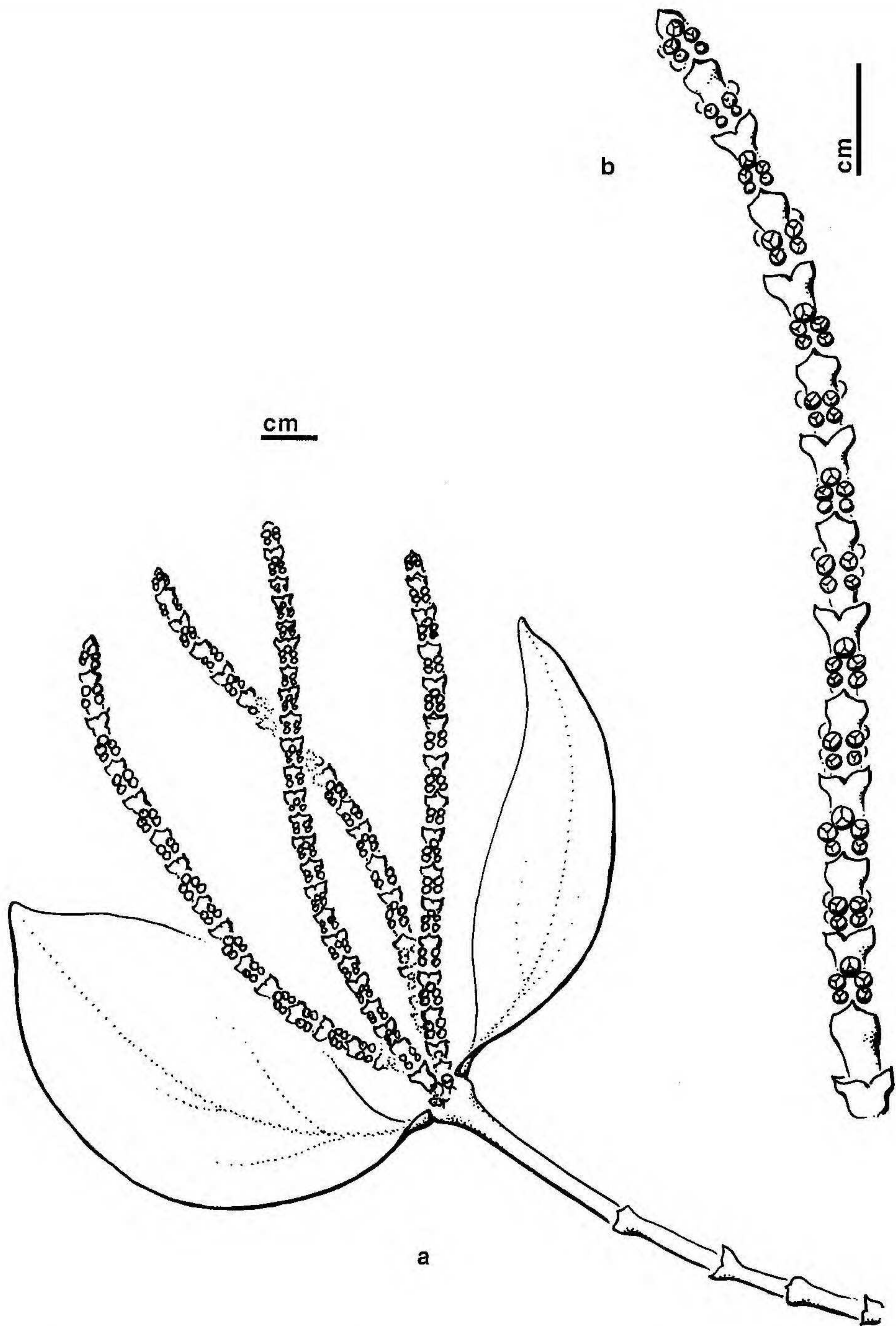


Figure 12. *Phoradendron palandensis* Kuijt. —A. Habit of determinate innovation. —B. Inflorescence. A, B drawn from the holotype Quizhpe & Wisum 2496 (UC).

expand to produce a second crop of flowers. Similar maturation/development of the inflorescences is known to exist in the Cuban and Hispaniolan *Dendrophthora tetrastachya* (Wright ex Griseb.)

Urb. (cf. Kuijt, 1961: 113, fig. 52), as well as in the Panamanian hyperparasite *P. fasciculatum* (Kuijt, 2003a). In both taxa, a second generation of flowers indeed does result, with the former separated from the

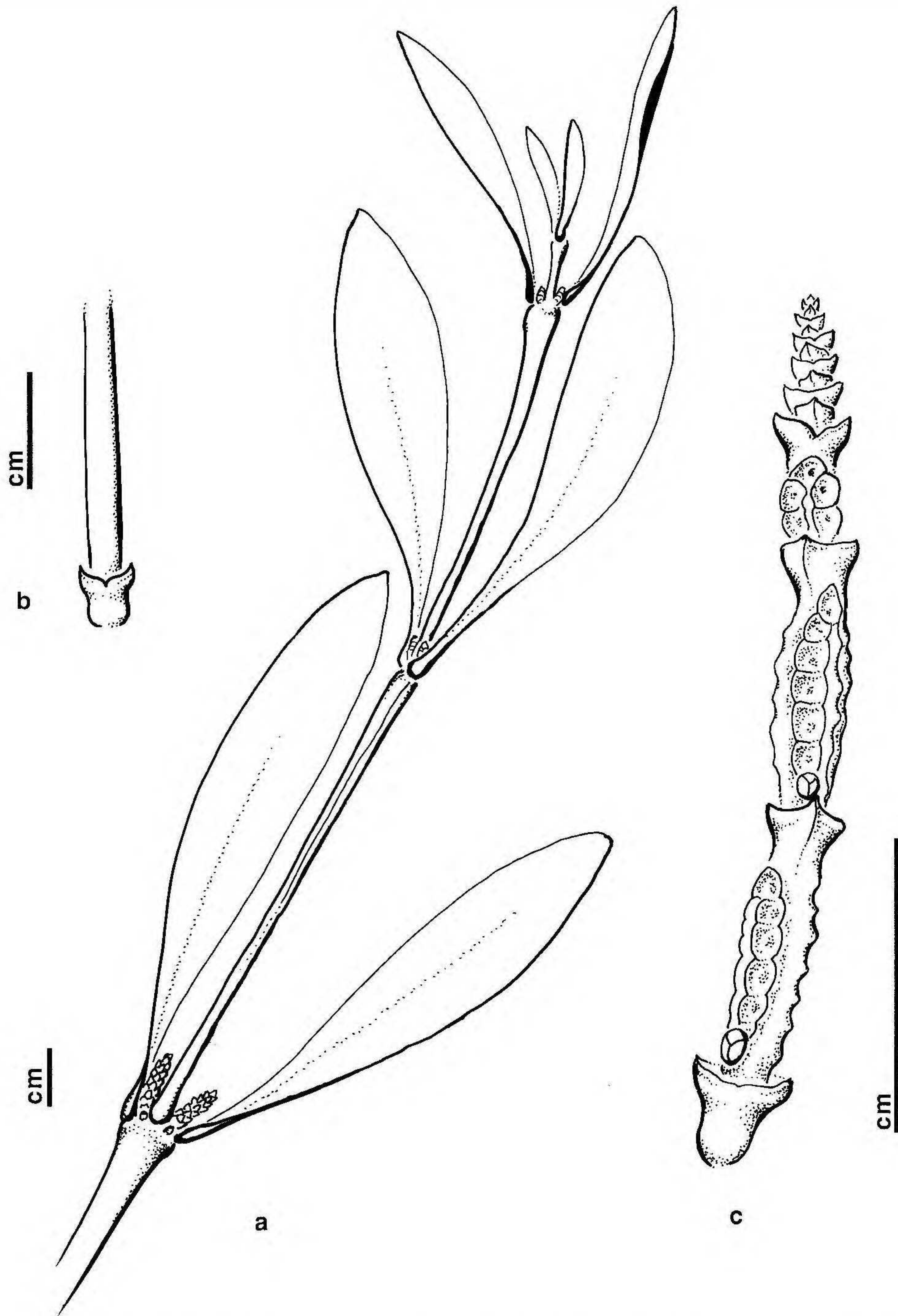


Figure 13. *Phoradendron prolongatum* Kuijt. —A. Leafy shoot. —B. Basal cataphylls. —C. Old inflorescence with proliferating tip. A–C drawn from the type *Smith & Cabanillas 7085* (UC).

earlier ones by a few cataphylls. The possibility of this proliferation in *P. prolongatum* being teratological cannot be excluded, but this might also be a specific character.

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